

BEST AVAILABLE COPY

Final Report

NAS-9-12008

DRL Line Item No. 12

DRD No. MA-129TB

*N73-24215*  
*CR-128935*

# **Multifunction Display System**

**Volume II**

**Appendices**

**February 1973**

**Advanced Technology Laboratories  
Government and Commercial Systems**

**RCA**

**Burlington, Massachusetts 01803**

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MULTIFUNCTION DISPLAY SYSTEM

Volume II

Appendices

February 1973

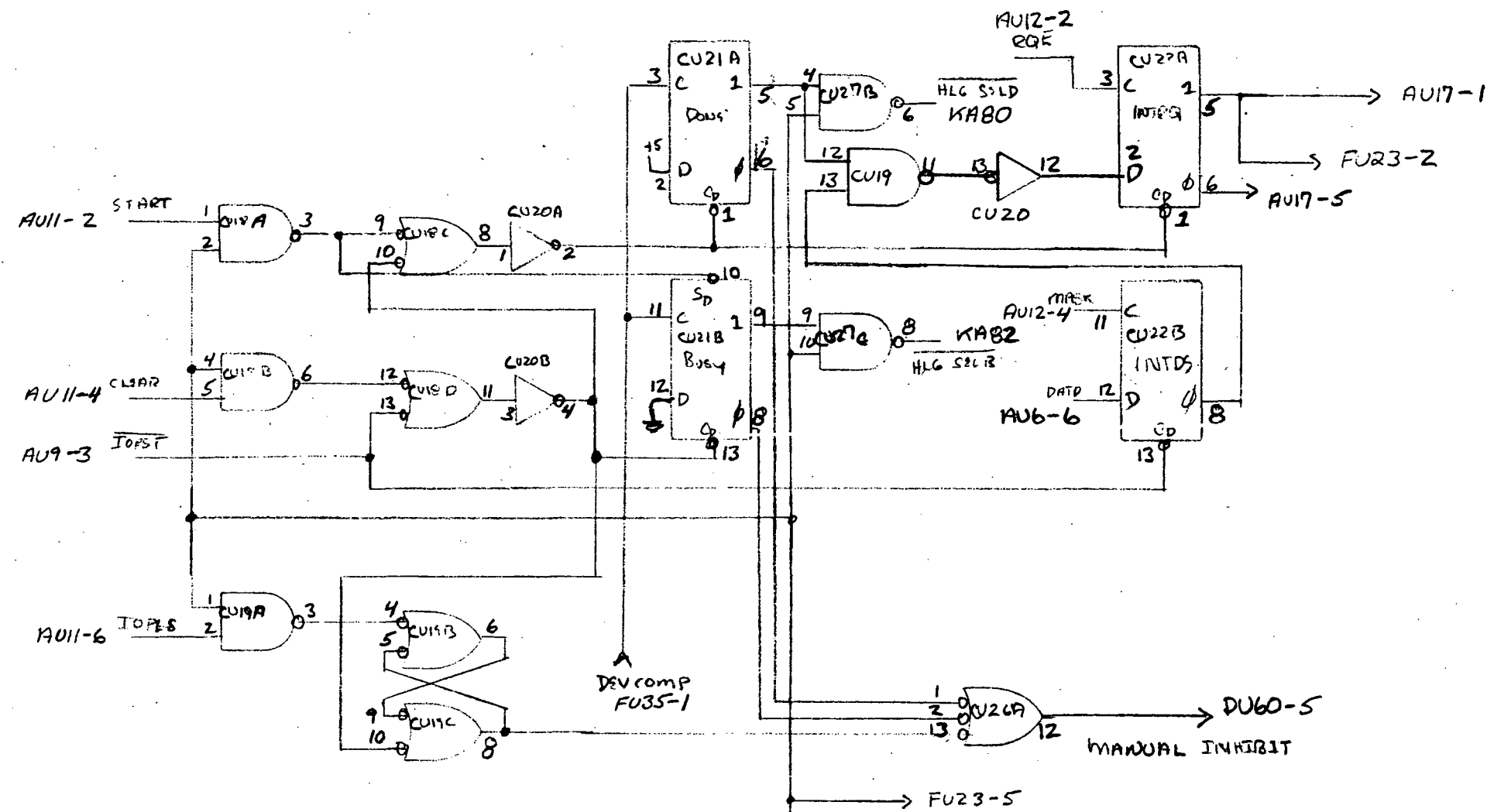
Advanced Technology Laboratories  
Government and Commercial Systems  
RCA  
Burlington, Massachusetts 01803

## FOREWORD

This volume is an Appendix volume to the Final Report prepared under Contract NAS-9-12008. It contains special interface circuitry located in slots 16 and 17 of the NOVA 1200 Control Subsystem of the Multifunction Display System, as well as the back plane wiring lists of that Subsystem.

## APPENDIX I

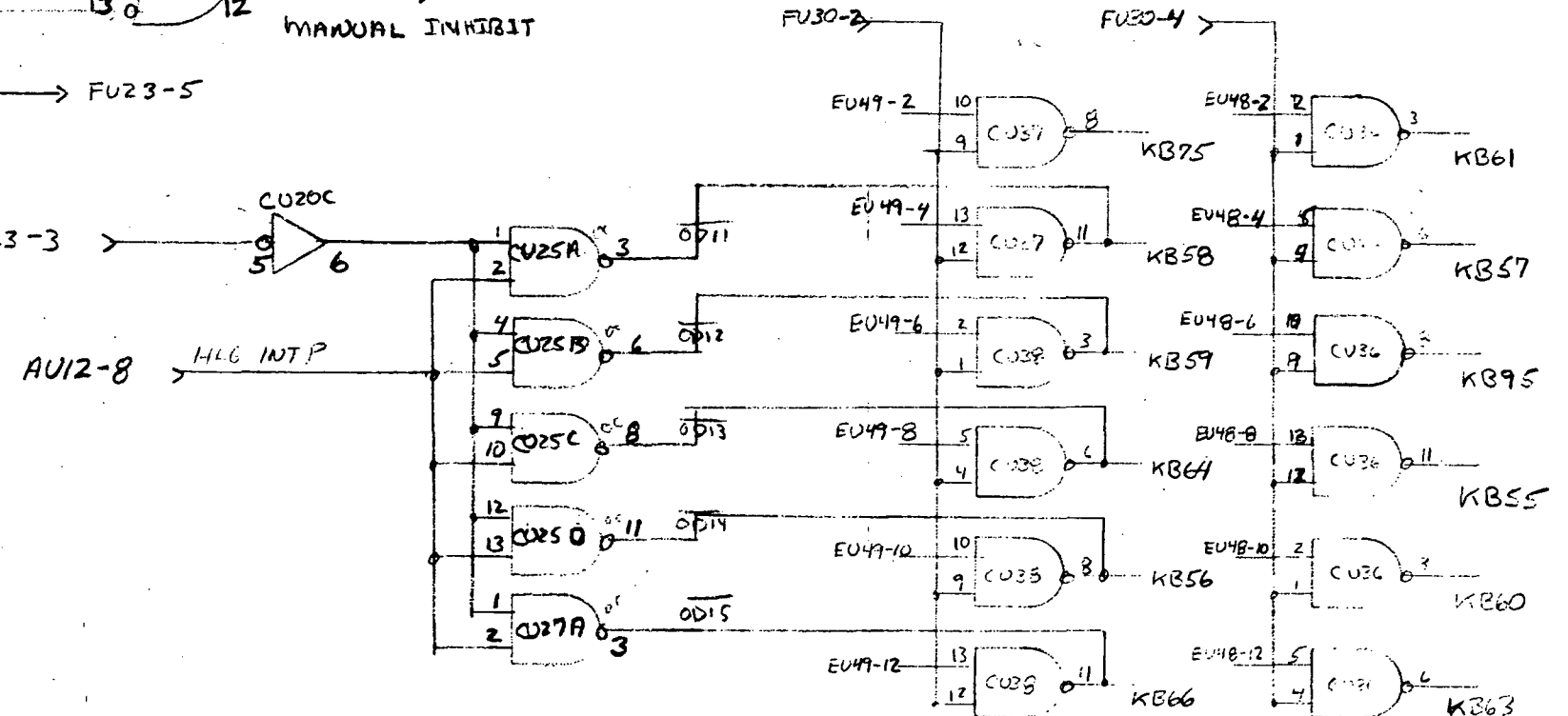
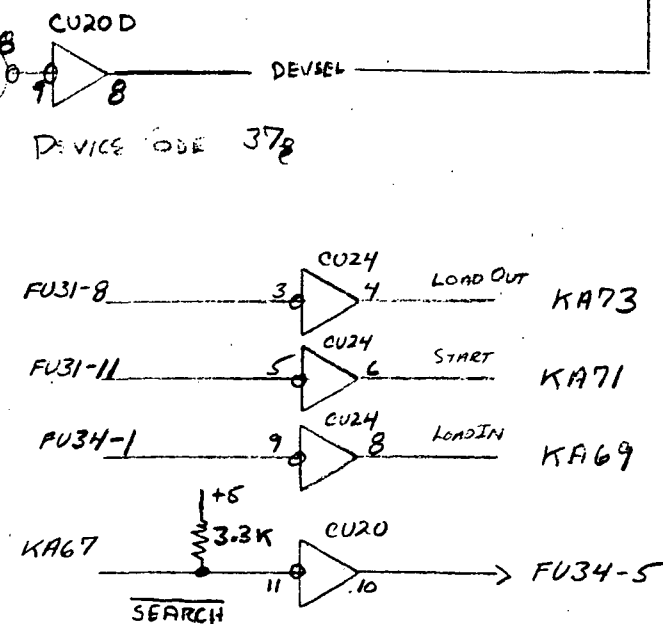
### NOVA INTERFACE CIRCUITRY



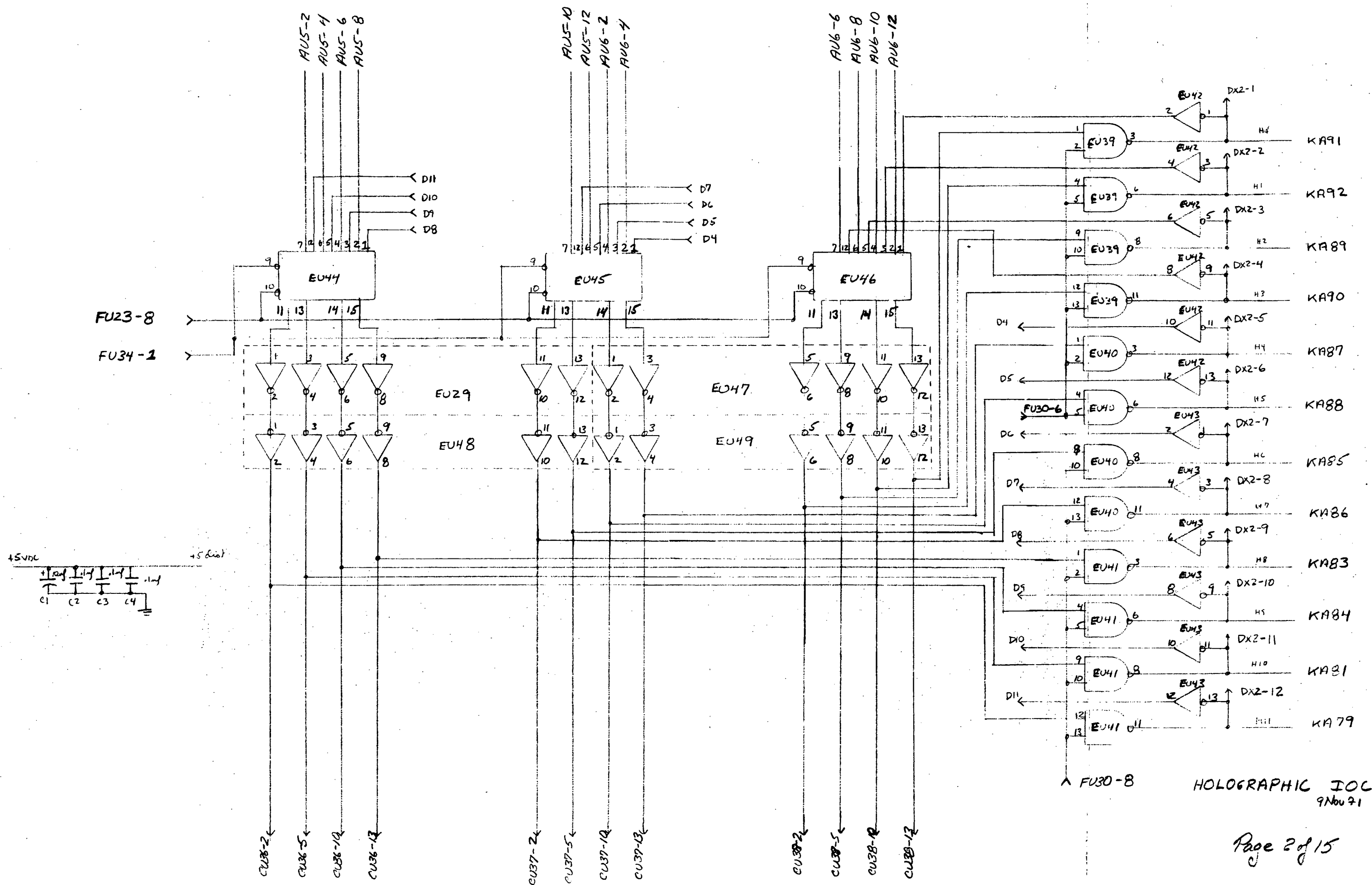
U18, U19, U23, SN7400  
 U20 SN7404  
 U21, U22 SN7474  
 U17, U25, U27 SN7438  
 U24 SN7404  
 U26 SN7410  
 U28 SN7430

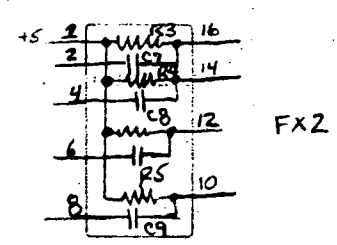
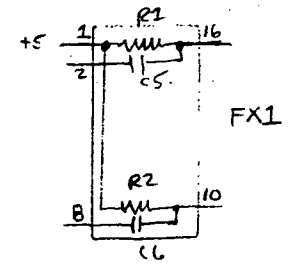
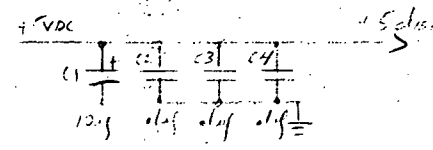
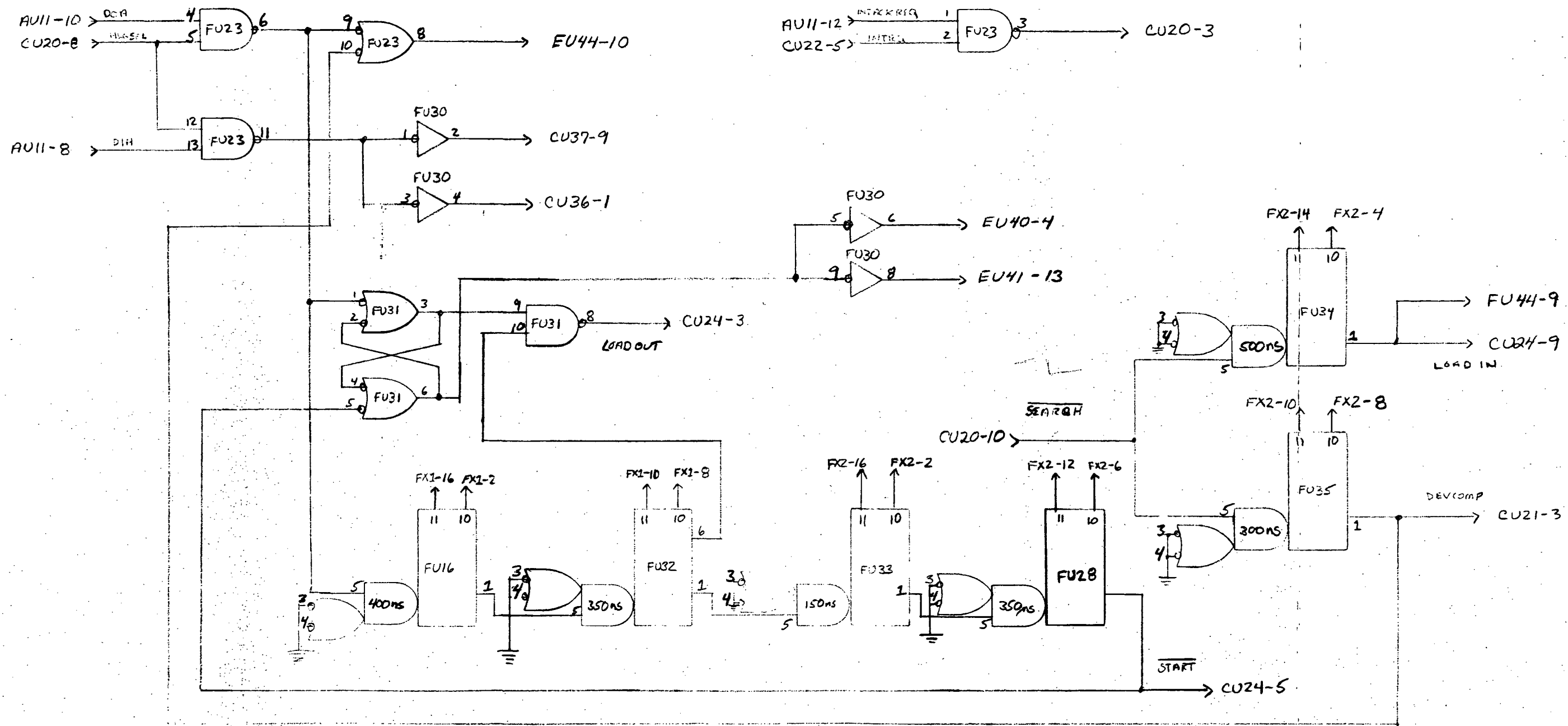
NO'S U10-U14 ARE NOT USED

AU7-4 1,12 DS3  
 AU7-6 2,11 DS3  
 AU7-10 3,4,5,6 DS4  
 AU8-2 DS4  
 AU8-6 DS4  
 AU8-10 DS4

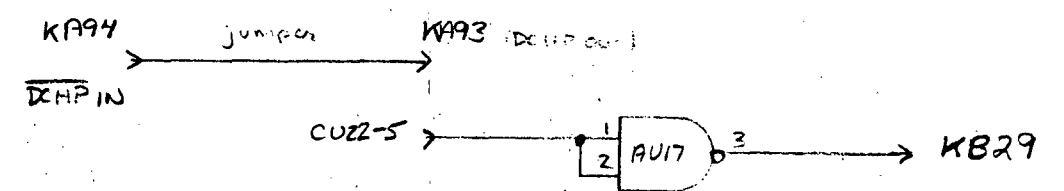
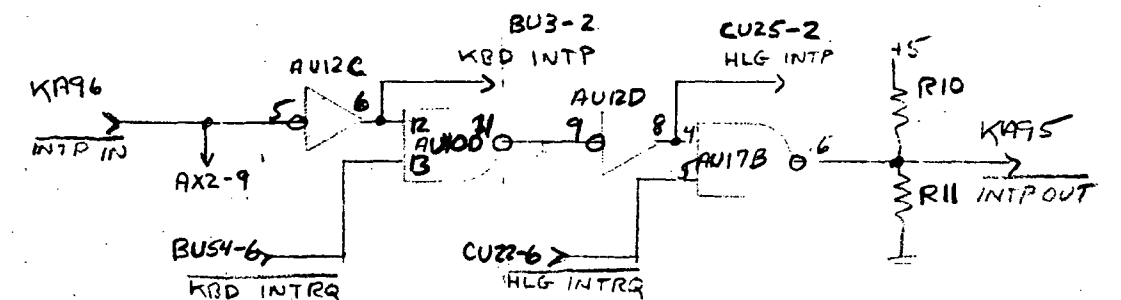
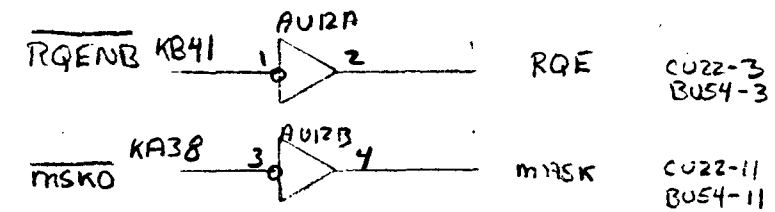
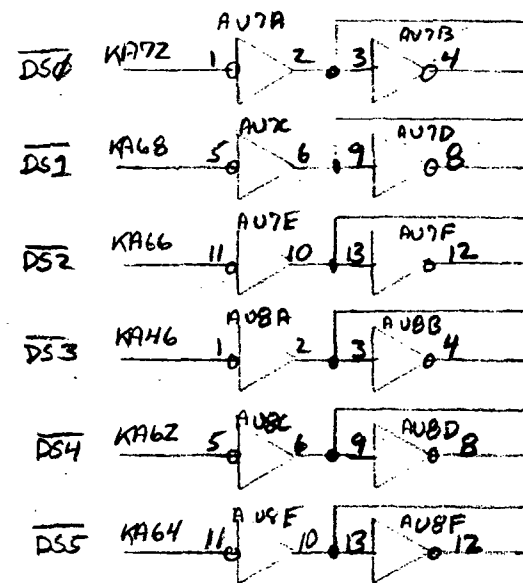
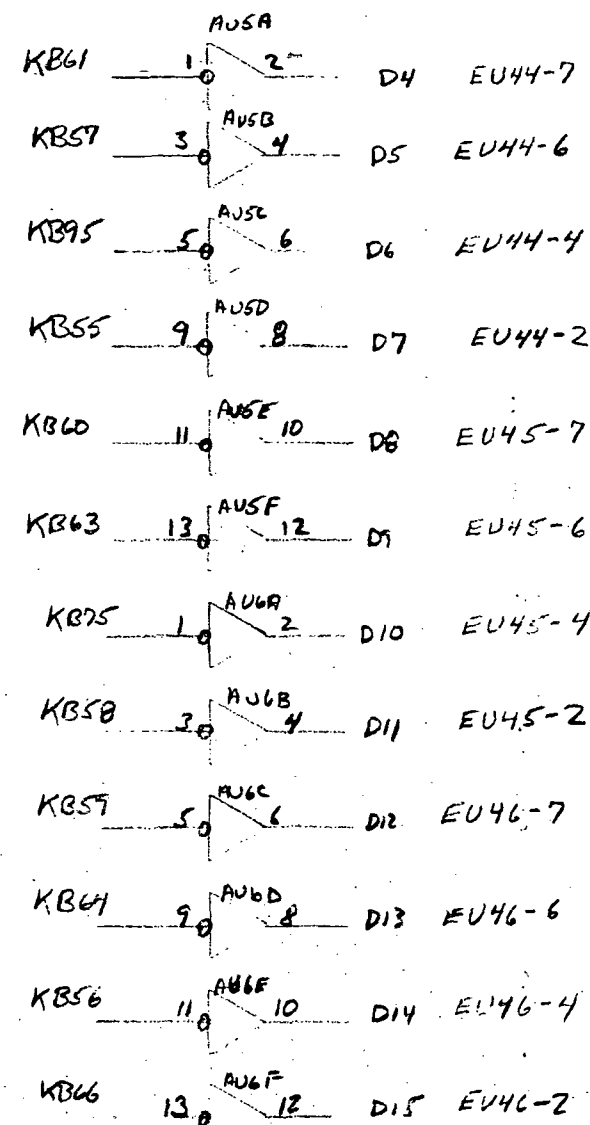


HOLOGRAPHIC SYSTEM INTERFACE  
 9 Nov 71



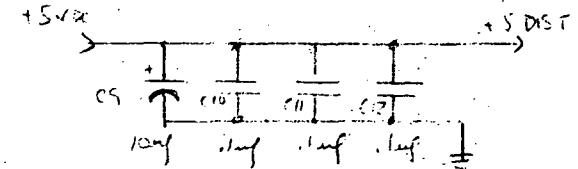
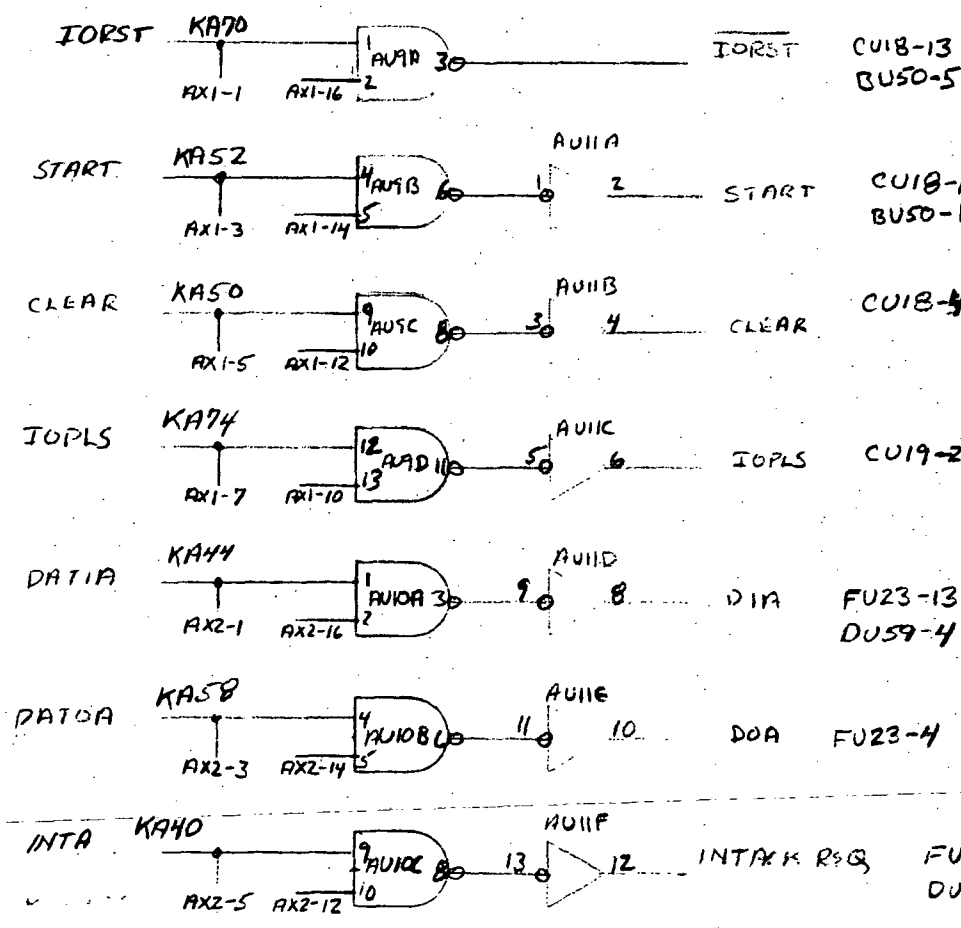
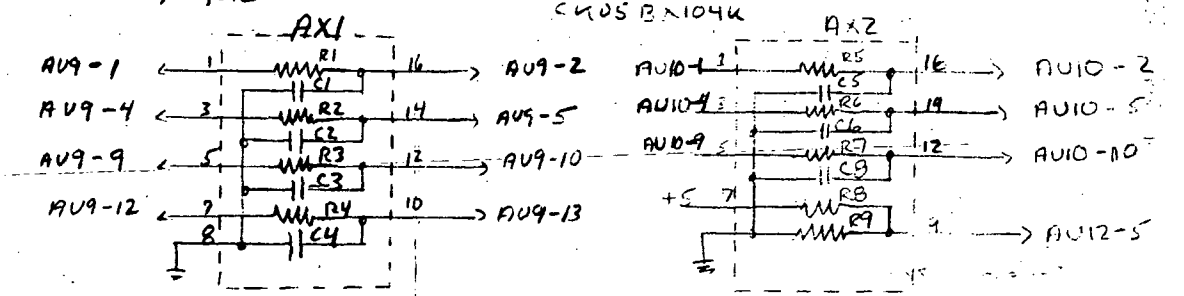


HOLOGRAPHIC IOC  
7 Nov 71



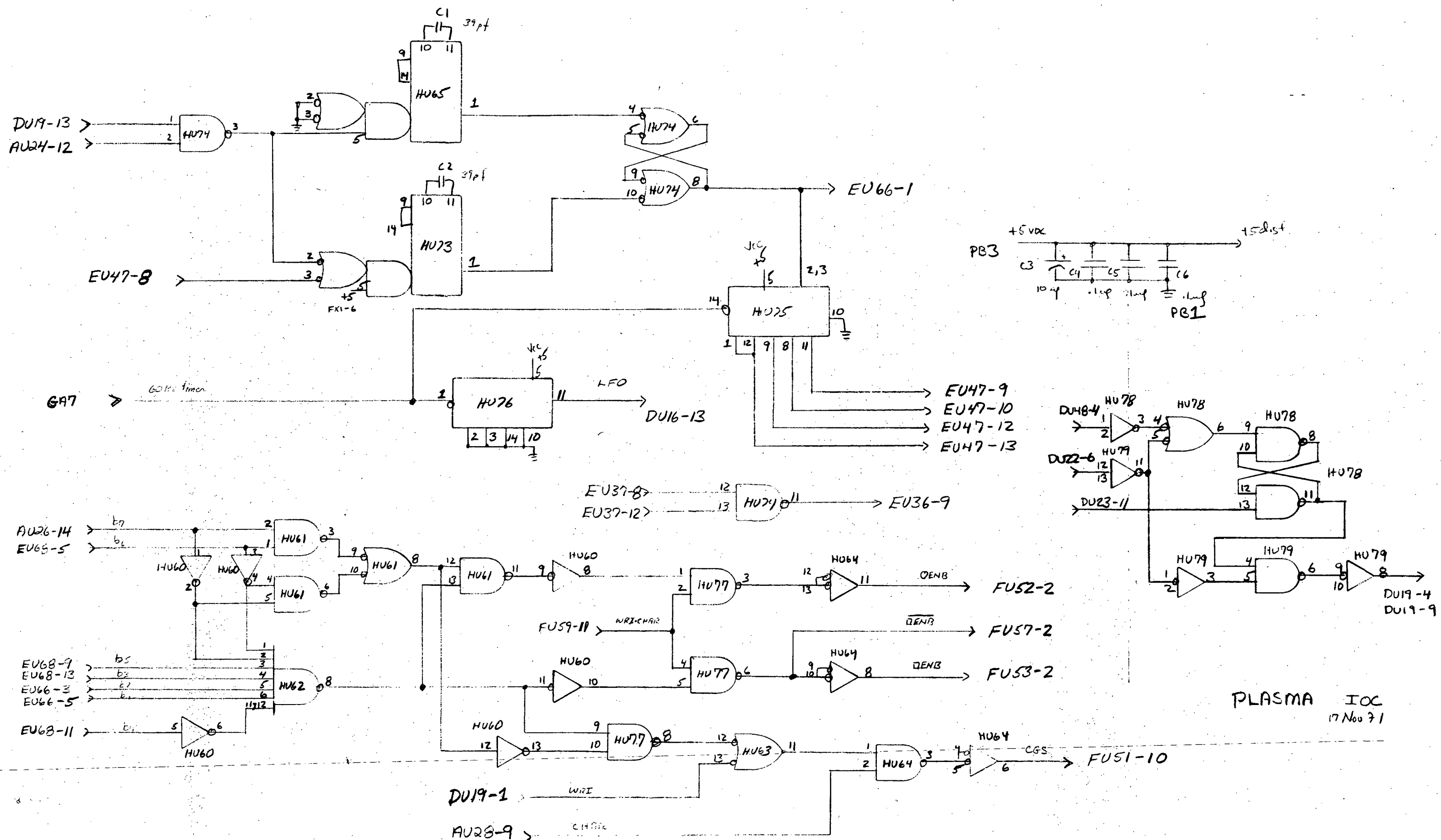
US, U6, U7, U8, U11, U12  
 U9, U10  
 R1, R2, R3, R4, R5, R6, R7  
 R8, R10  
 R9, R11  
 C1, C2, C3, C4, C5, C6, C7  
 C9  
 C10, C11, C12

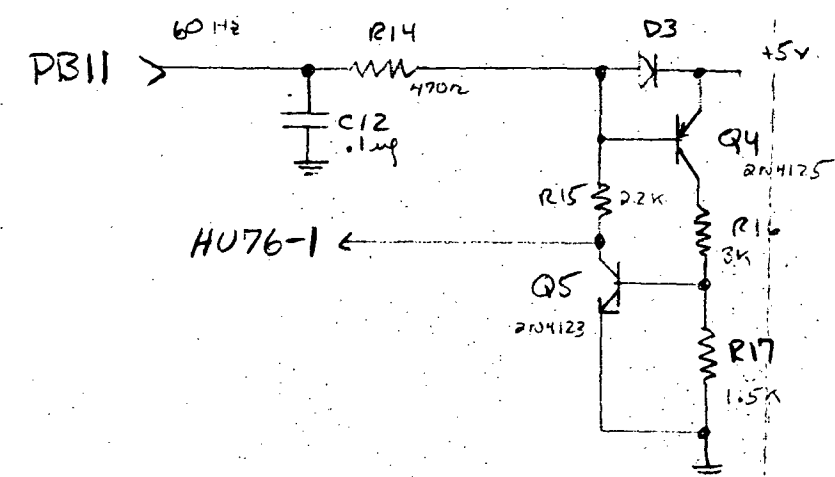
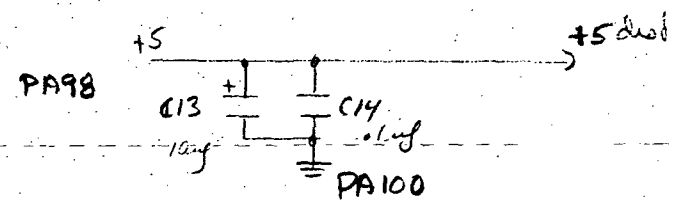
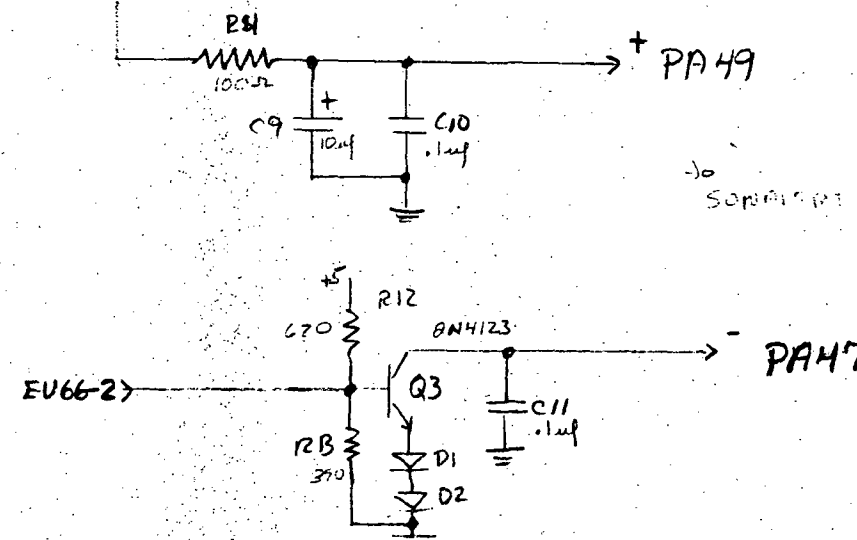
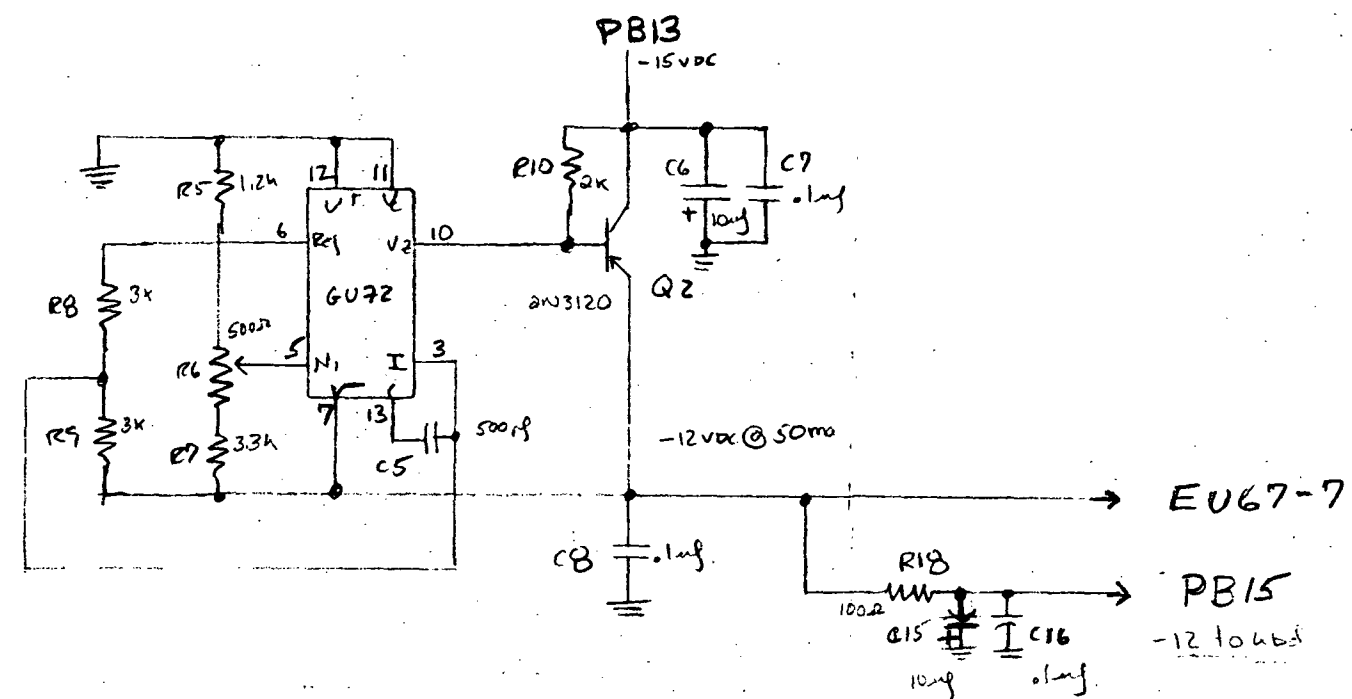
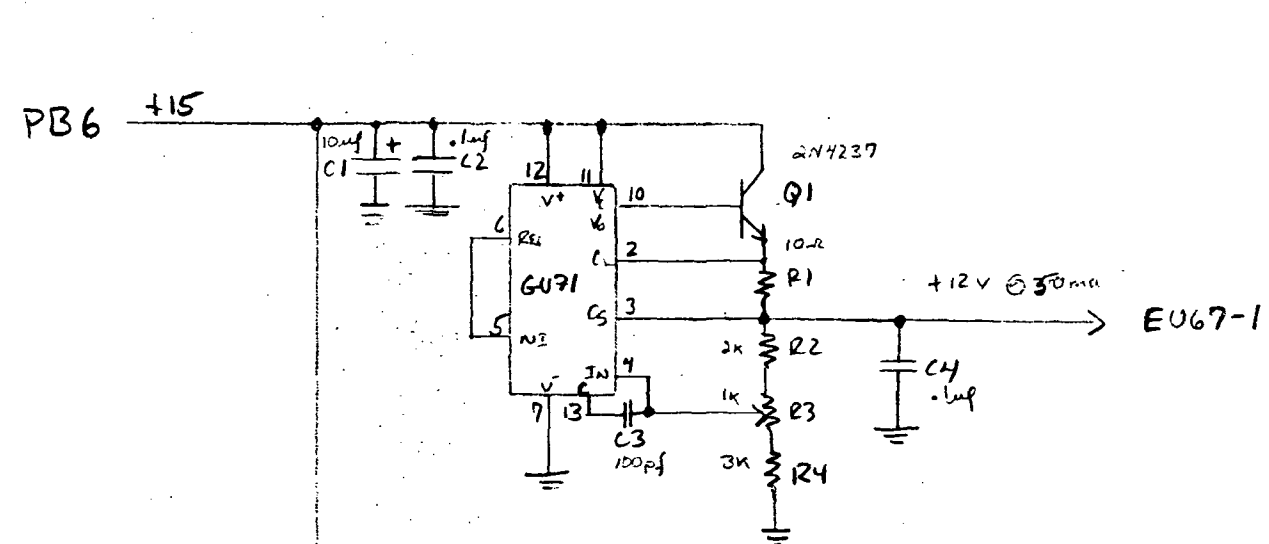
SN7404J  
 SN7400J  
 RC05GF102J  
 RC05GF332J  
 RC05GF31J  
 CM05FD101J03  
 CLG5CJ100M1P3  
 CM05BX104K



Hologram Keyboard IOL - Common Receivers  
 9 Nov 71

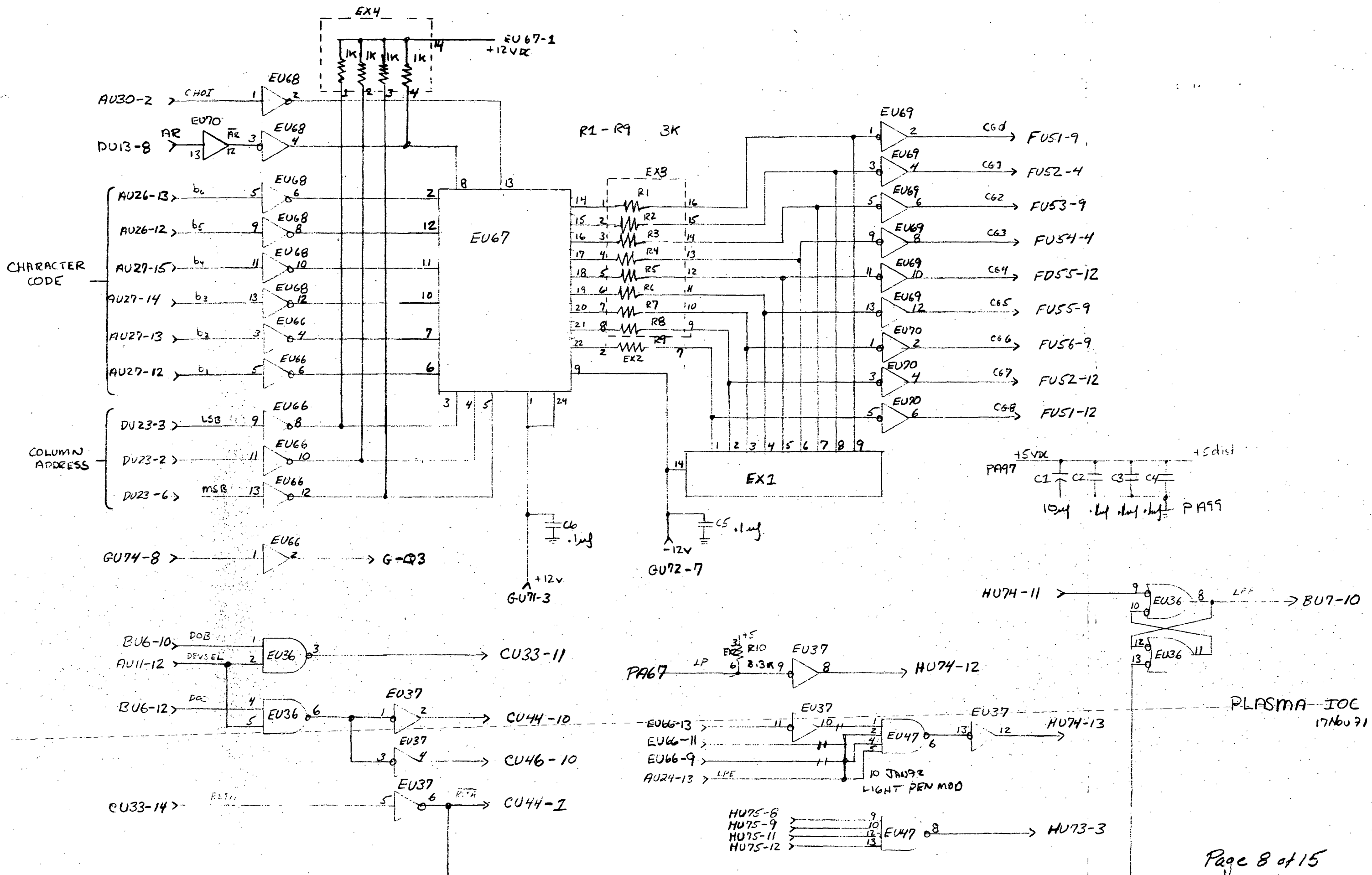




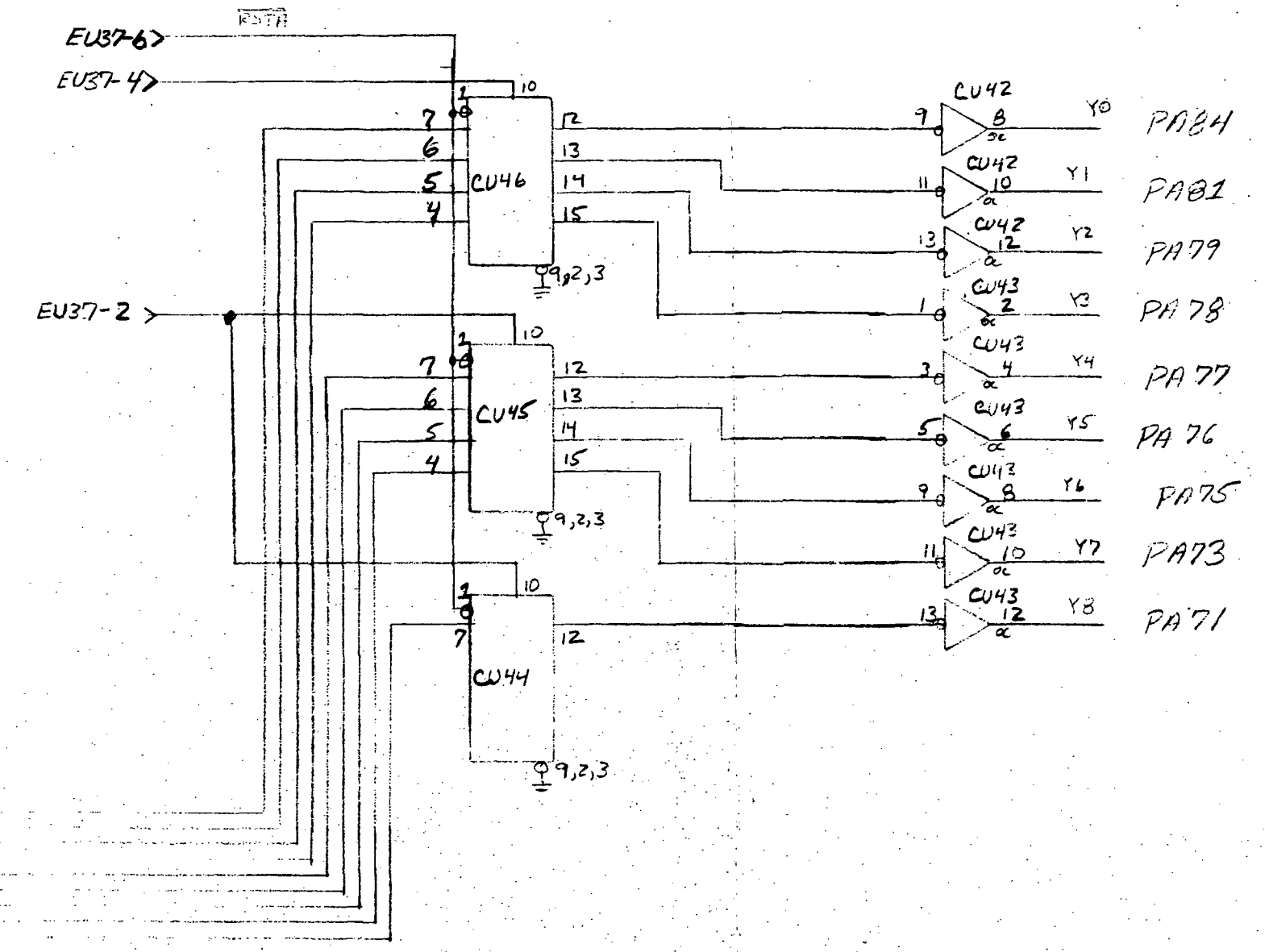
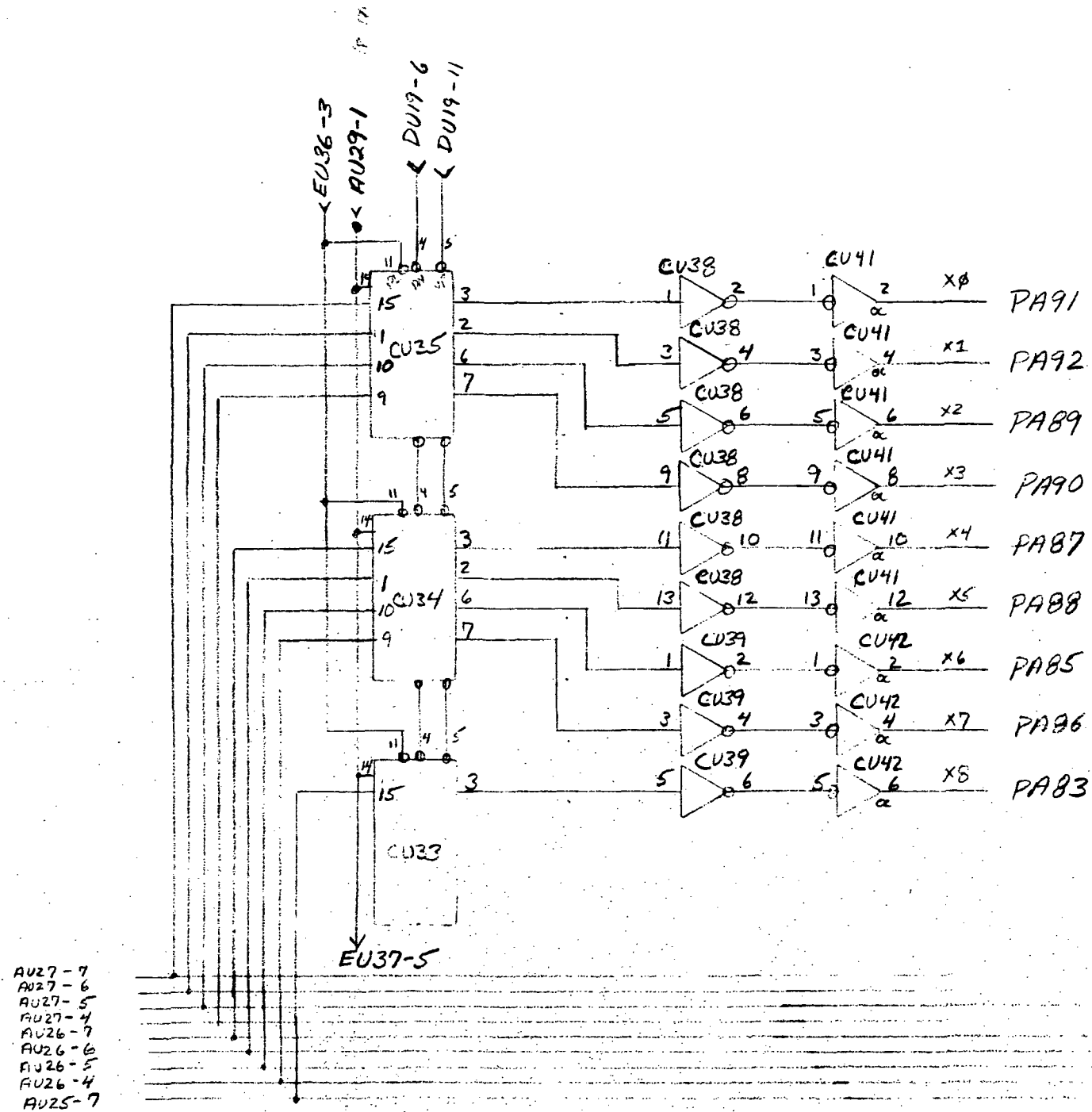


PLASMA IOC  
17 Nov 71



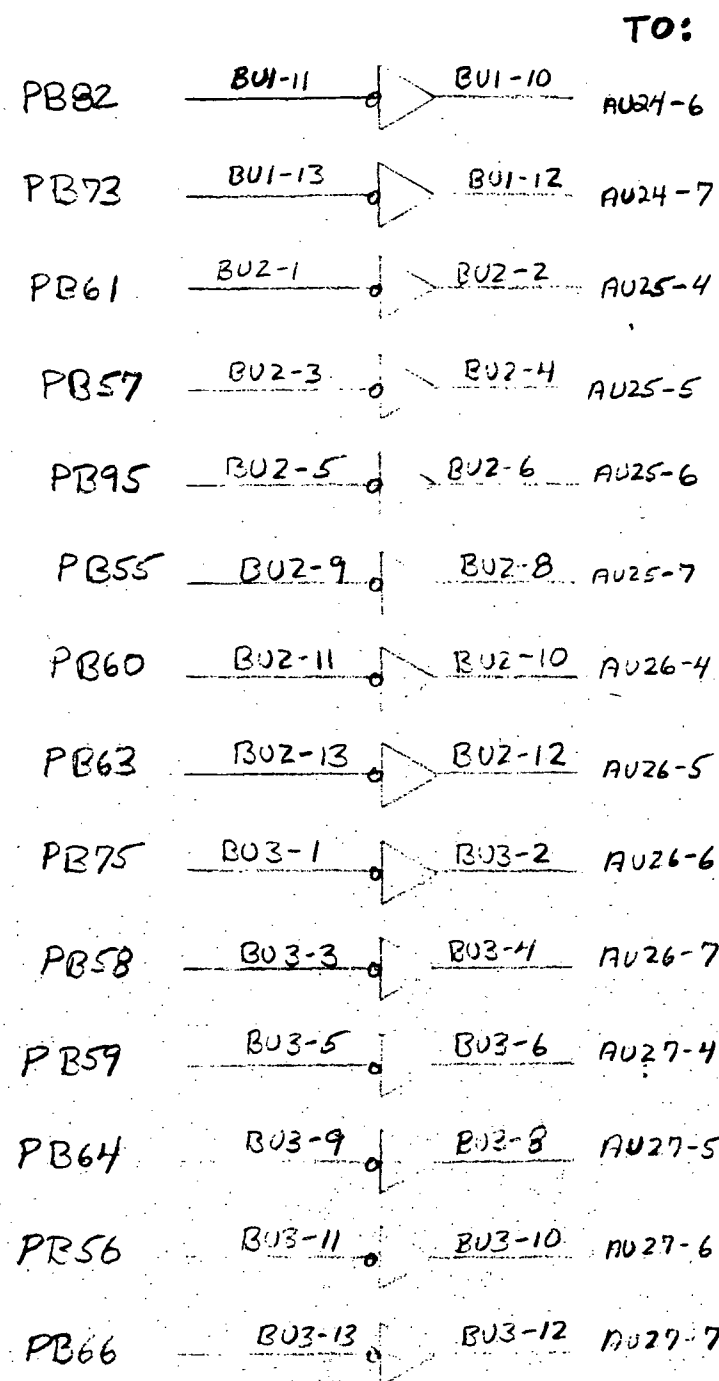




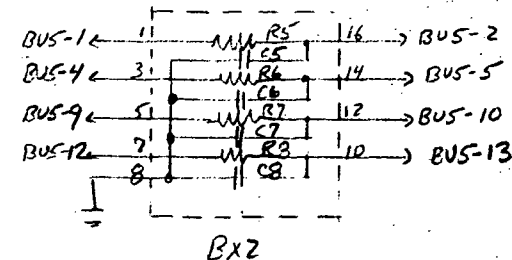
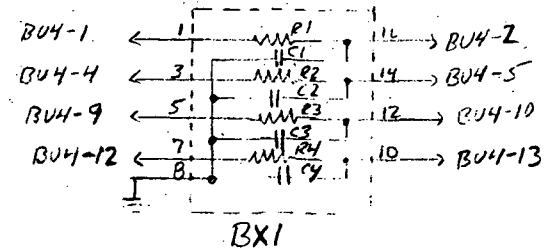
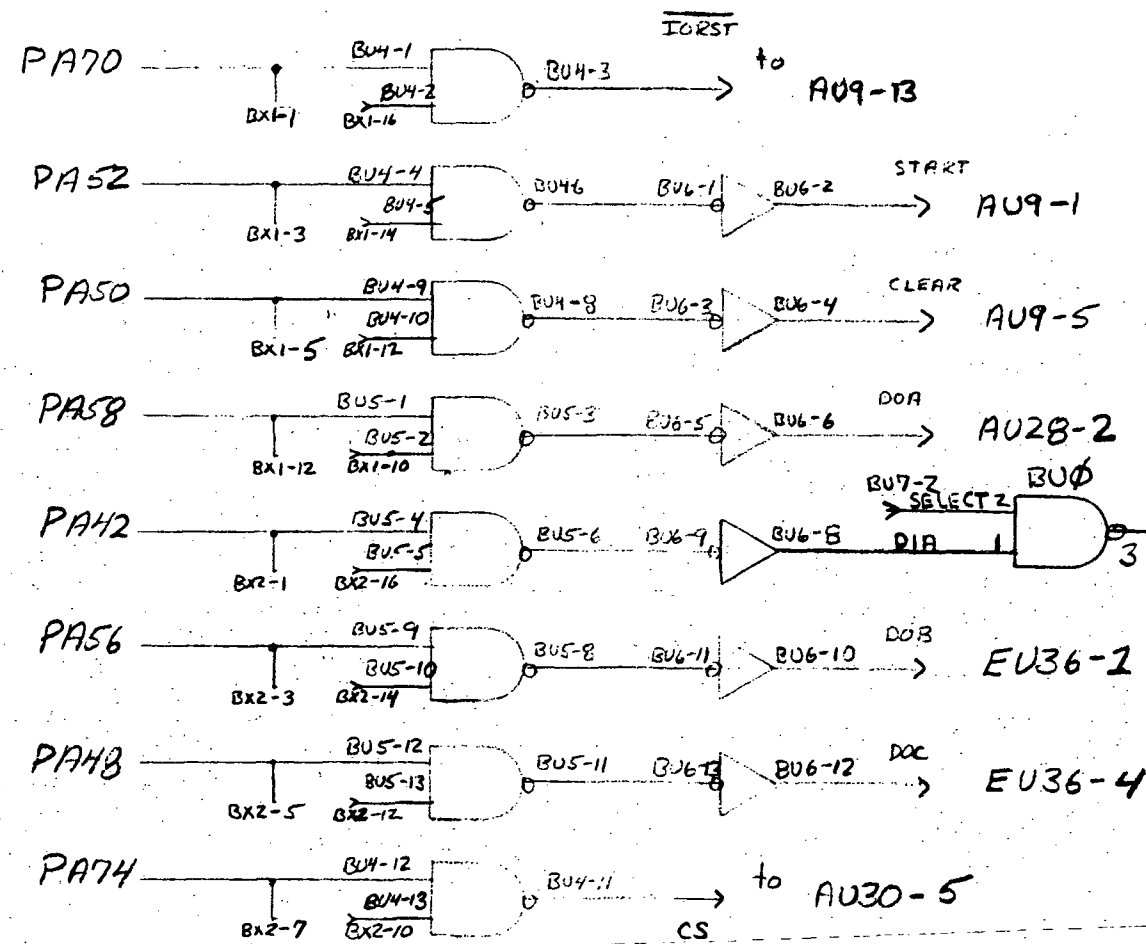
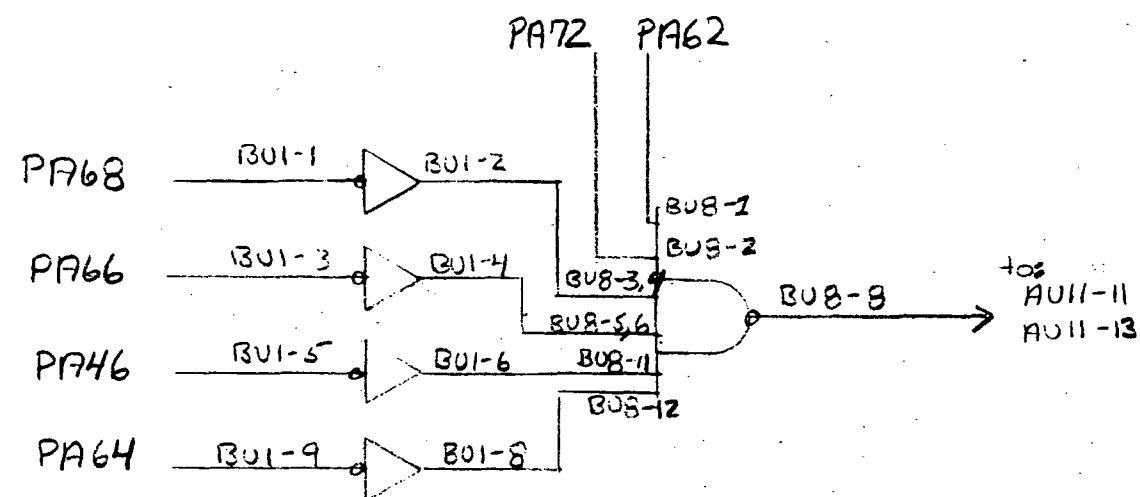


PLASMA IOC  
16 Nov. 71



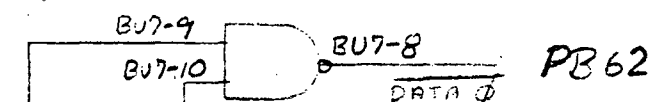
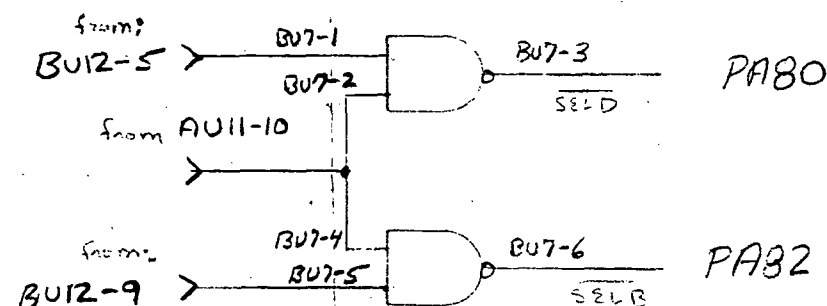


R1-R8 1k  
C1-C8 100pf

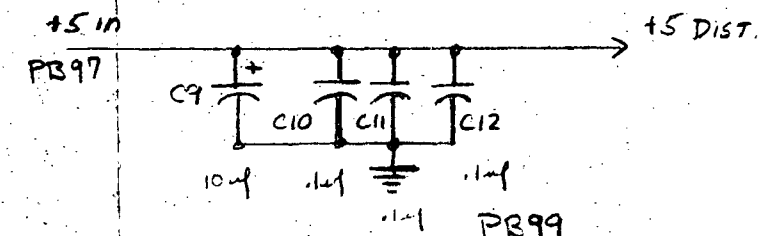


PA96 JUMPER PA95

PA94 JUMPER PA93



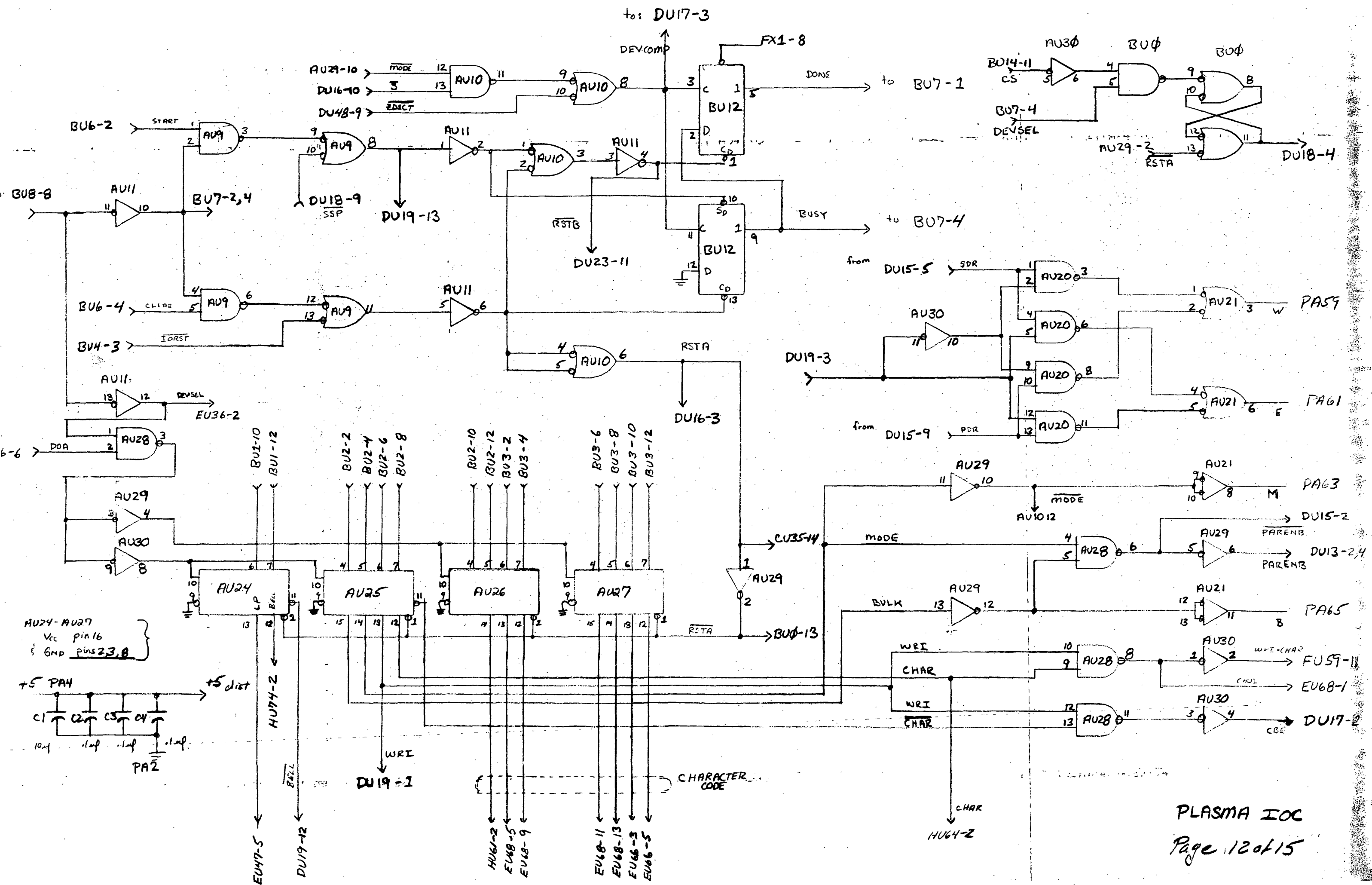
from: EU36-8



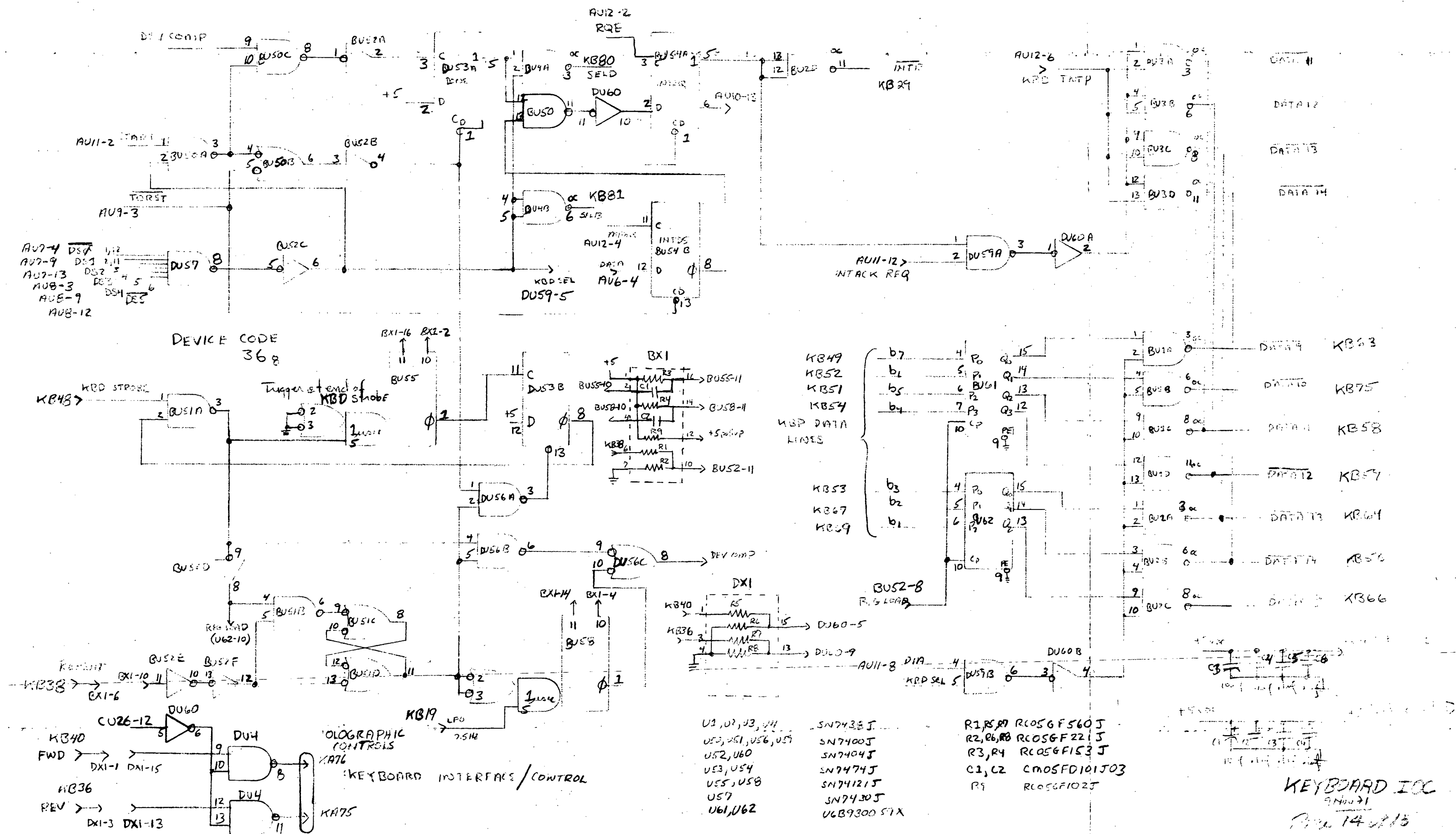
PLASMA IOC

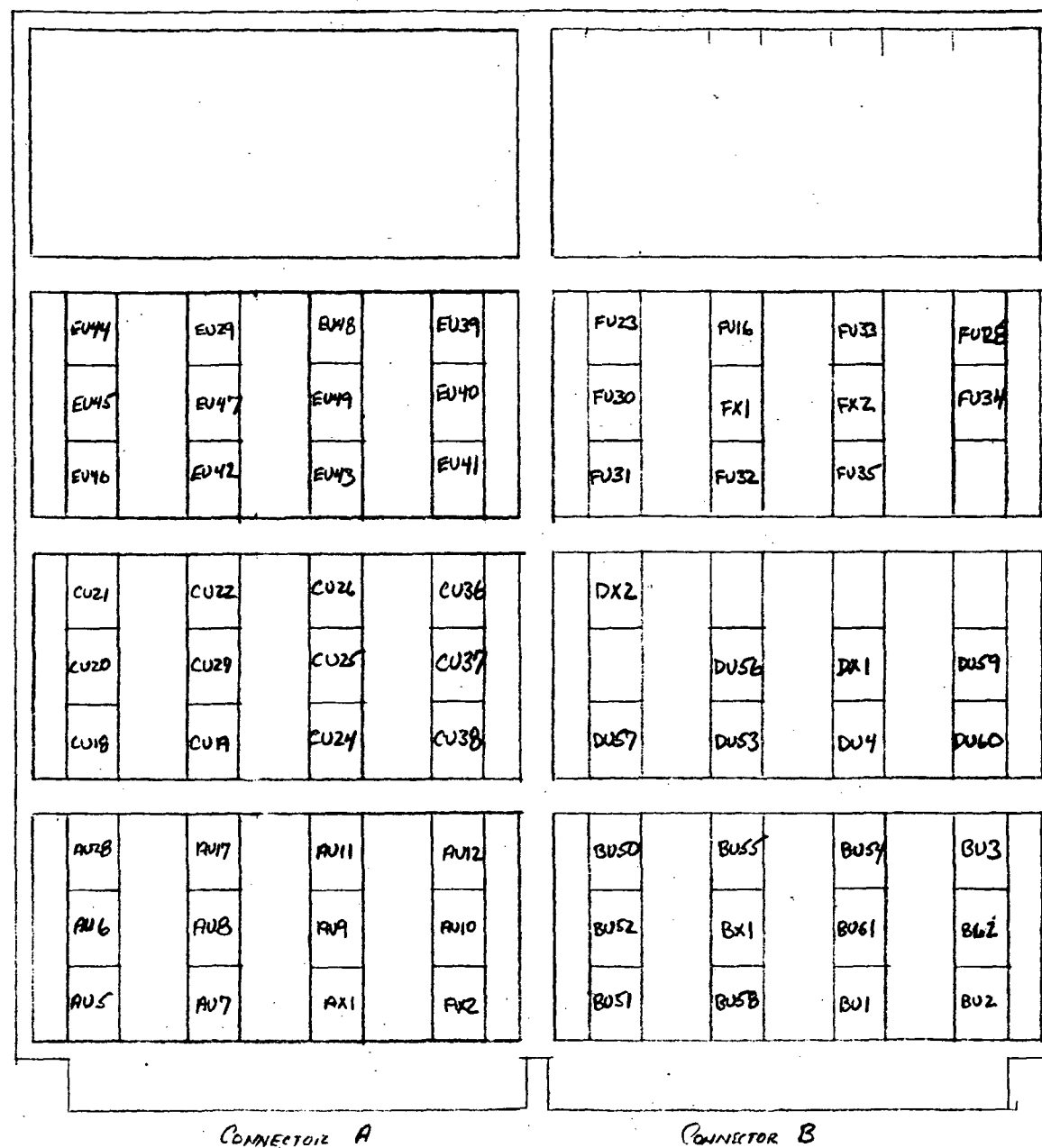
15 NOV 71



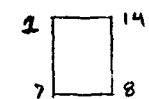




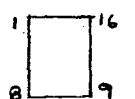




14 pin IC



16 pin IC



HOLOGRAPHIC AND KEYBOARD INTERFACE

# PLASMA PINEL CONTROLLER

## IC LIST

B	U4	7400
B	U1	7404
B	U2	7404
B	U3	7404
B	U4	7400
B	U5	7400
B	U6	7404
B	U7	7438
B	U8	7430
A	U9	7400
A	U10	7400
A	U11	7404
B	U12	7474
D	U13	7400
D	U14	74121
D	U15	7474
D	U16	7404
D	U17	7474
D	U18	9601
D	U19	7400
A	U20	7400
A	U21	7400
D	U22	74121
D	U23	74193

PLASMA/RYUCC CONTROLLER  
TC LIST

A	U24	9300
A	U25	9300
A	U26	9300
A	U27	9300
A	U28	7400
A	U29	7404
A	U30	7404
	U31	SPARE NUMBER
	U32	SPARE NUMBER
C	U33	74193
C	U34	74193
C	U35	74193
E	U36	7400
E	U37	7404
C	U38	7404
C	U39	7404
	U40	SPARE NUMBER
C	U41	7404
C	U42	7404
C	U43	7404
C	U44	9300
C	U45	9300
C	U46	9300
E	U47	7420

# PLASMA MODEL CONTROLLER IC LIST

D	U48	74155	
D	U49	7400	
F	U50	7404	
F	U51	7400	
F	U52	7400	
F	U53	7403	
F	U54	7403	
F	U55	7403	
F	U56	7403	
F	U57	7410	
F	U58	7404	
F	U59	7404	
H	U60	7404	
H	U61	7400	
H	U62	7430	
F	U63	7404	
H	U64	7400	
H	U65	74121	
E	U66	7405	
E	U67	EA 4001	(ELECTRONIC ARRAYS)
E	U68	7405	
E	U69	7404	
E	U70	7404	
G	U71	7423C	

# PLANA PANEL CONTROLLER

G	U72	WA 723 C
H	U73	74121
H	U74	7400
H	U75	7493
H	U76	7493
H	U77	7400
H	U78	7400
H	U79	7400



# Keyboard & Bayector Interface IC list

B	U1	7438
B	U2	7438
B	U3	7438
D	U4	7438
A	U5	7404
A	U6	7404
A	U7	7404
A	U8	7404
A	U9	7400
A	U10	7400
A	U11	7404
A	U12	7404
	U13	SPARE NUMBER
	U14	SPARE NUMBER
	U15	SPARE NUMBER
F	U16	74121
A	U17	7438
C	U18	7400
C	U19	7400
C	U20	7404
C	U21	7474
C	U22	7474
F	U23	7400
C	U24	7404

KEYBOARD & PROJECTOR CONTROLLER  
IC LIST

C	U25	7438
C	U26	7410
C	U27	7438
F	U28	74121
F	U29	7404
F	U30	7404
F	U31	7400
F	U32	74121
F	U33	74121
F	U34	74121
F	U35	74121
C	U36	7438
C	U37	7438
C	U38	7438
E	U39	7403
E	U40	7403
E	U41	7403
E	U42	7404
E	U43	7404
E	U44	74L98
E	U45	74L98
E	U46	74L98
E	U47	7404
E	U48	7404

# KEY BOARD & PROJECTOR CONTROLLER

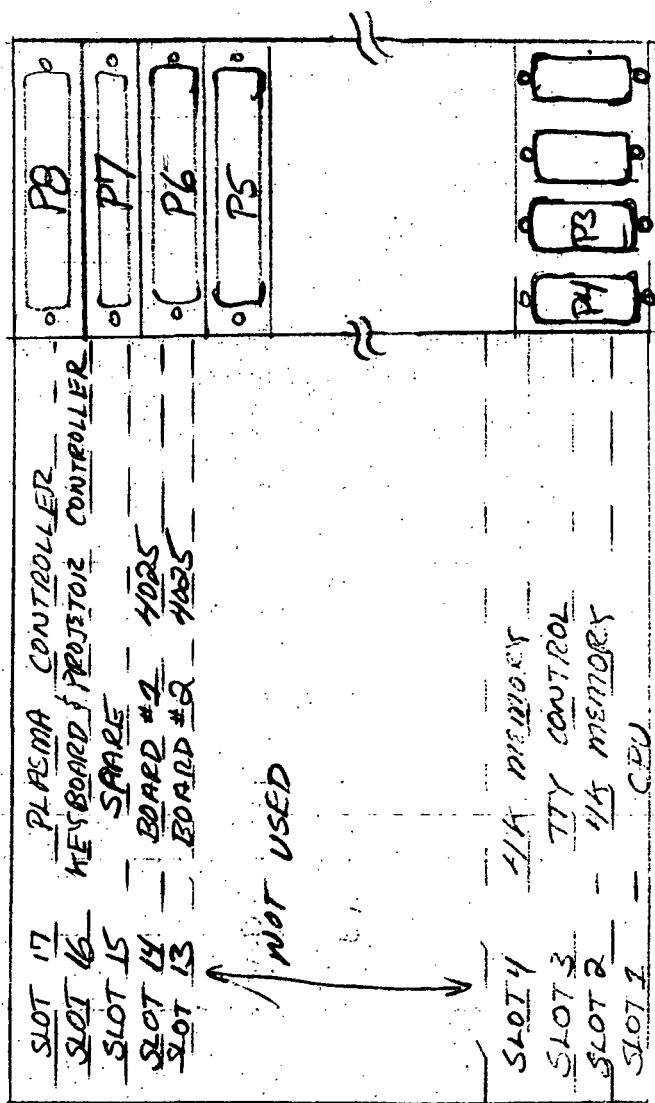
## TC LIST

E	U49	7464
B	U50	7400
B	U51	7400
B	U52	7404
D	U53	7474
B	U54	7474
B	U55	74121
D	U56	7400
D	U57	7430
B	U58	74121
D	U59	7400
D	U60	7404
B	U61	9300
B	U62	9300

## **APPENDIX II**

### **NOVA SUBSYSTEM BACK PLANE AND CABLE LISTS**

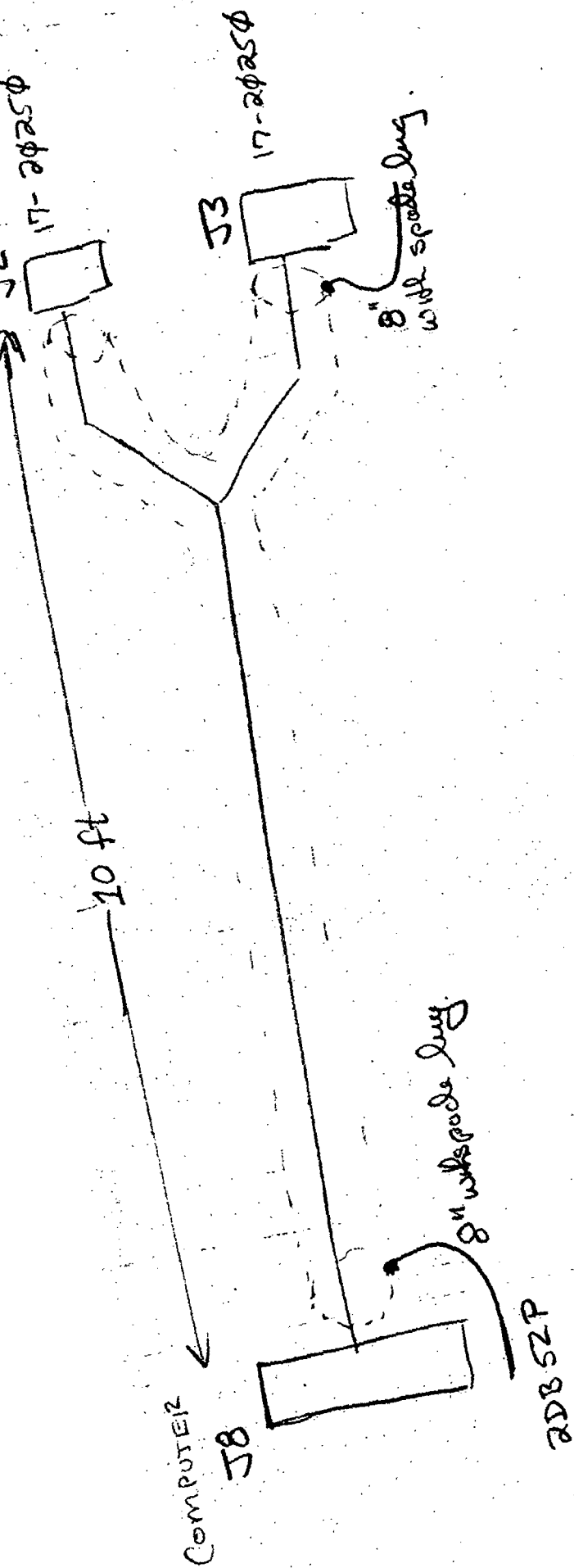
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P3 - TTY CONNECTION  
P5 - 4025 CONNECTION  
P6 - KEYBOARD CONNECTION  
P7 - PROJECTOR CONNECTION  
P8 - PLASMA CONNECTION

SLOT 1 NOVA 1200 CPU  
SLOT 2 4K MEMORY PLANE  
SLOT 3 TELETYPE INTERFACE  
SLOT 4 4K MEMORY PLANE  
SLOT 13 4025 BOARD 2  
SLOT 14 4025 BOARD 1  
SLOT 16 KEYBOARD / PROJECTOR CONTROLLER  
SLOT 17 PLASMA CONTROLLER

NOVA 1200 SUBASSEMBLY INSTALLATION  
AND CONNECTOR DESIGNATIONS



COMPUTER / PLASMA PANEL  
INTERFACE CABLE

# COMPUTER / PLASMA PANEL INTERFACE CABLE

From Connector J8 Nova Frame 2DB 52P  
 to J2, J3 ~~and~~ PLASMA PANEL 12-20250 P  
 Wire #24 STRANDED

From	To	Function
1	J2-1	X0
2	J2-2	X1
3	J2-3	X2
4		
5	J2-10	Y0
6	J2-11	Y1
7	J2-12	Y2
8		
9	J3-16	P15
10	J3-15	P14
11	J3-14	P13
12	J3-13	P12
13		
14	J3-17	MODE
15	J2-19	WRITE
16		
17		
18	J2-4	X3
19		

# COMPUTER / PLASMA PANEL INTERFACE CABLE

From	To	Function
20	J2-5	X4
21	J2-6	X5
22	J2-13	Y3
23	J2-14	Y4
✓ 24		
25	J2-15	Y5
26	J3-12	P11
27	J3-11	P10
— 28		
29	J3-10	P9
30	J3-9	P8
31	J3-8	P7
32		
33	J3-7	P6
34	J2-22	STATUS
35	<del>J2-23</del>	<del>STATUS SHIELD</del>
36	J2-7	X6
37	J2-8	X7
38	J2-9	X8
39		
40	J2-16	Y6
41	J2-17	Y7
42	J2-18	Y8
43		



# COMPUTER/PLASMA PANEL INTERFACE CABLE

From	To	Function
44	J3-6	P5
45	J3-5	P4
46	J3-4	P3
47	J3-3	P2
48		
49	J3-2	P1
50	J3-1	P0
51	J2-20	ERASE
52	J2-21	BULK

# PLASMA BACKPLANE WIRING

From - Backplane

To - Connector P8 2DB52S

Wire #30 AWG

From	To	Function
S17-A91	1	X0
S17-A91	2	X1
S17-A87	3	X2
S17-A1	4	GND
S17-A84	5	Y0
S17-A81	6	Y1
S17-A79	7	Y2
S17-A2	8	GND
S17-B69	9	P15
S17-B67	10	P14
S17-B53	11	P13
S17-B54	12	P12
S17-A34	13	GND
S17-A63	14	MODE
S17-A59	15	WRITE
S17-A33	16	WRITE RETURN
S17-A99	17	GND
S17-A90	18	X3
S17-A100	19	GND

Pins m11

# BACK PLANE WIRING

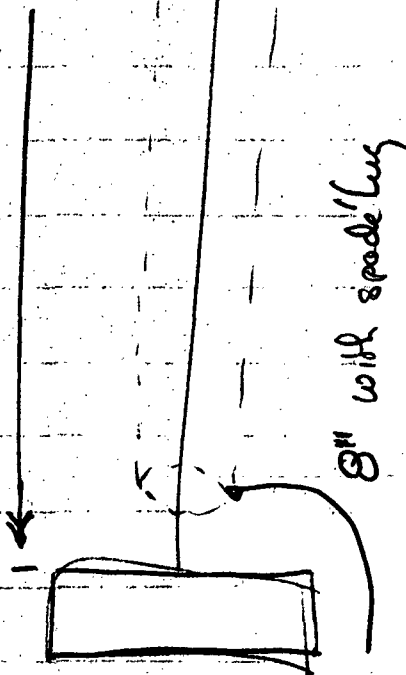
From	To	Function
S17-A87	20	X4
S17-A88	21	X5
S17-A78	22	Y3
S17-A77	23	Y4
S17-B1	24	GND
S17-A76	25	Y5
S17-B51	26	P11
S17-B52	27	P10
S17-B2	28	GND
S17-B49	29	P9
S17-B48	30	P8
S17-B40	31	P7
S17-B50	32	ERASE RETURN
S17-B38	33	P6
S17-A57	34	STATUS
S17-B89 ←	35	STATUS RETURN
S17-A85	36	X6
S17-A86	37	X7
S17-A83	38	X8
S17-B92	39	GND
S17-A75	40	Y6
S17-A73	41	Y7
S17-A71	42	Y8

# PLASMA BACKPLANE WIRING

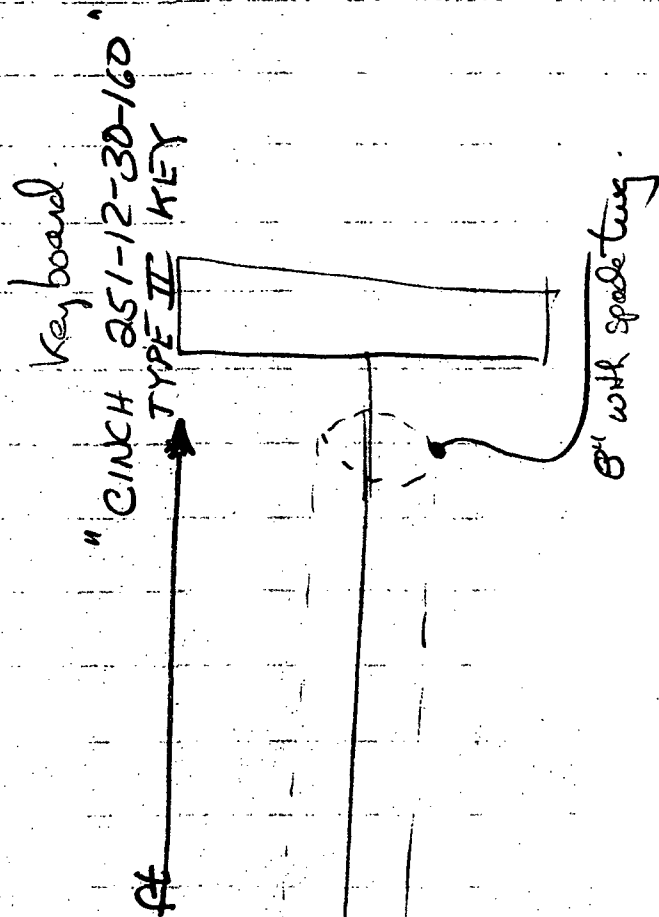
From	To	Function
S17-B99	43	GND
S17-B36	44	P5
S17-B34	45	P4
S17-B31	46	P3
S17-B29	47	P2
S17-B100	48	GND
S17-B25	49	P1
S17-B23	50	P0
S17-A61	51	ERASE
S17-A65	52	BULK

COMPUTER

DCB-ASP



J6



J2

COMPUTER / KEYBOARD  
CABLE INTERFACE

# COMPUTER/Keyboard Interface CABLE

To: J2 - Keyboard -

From: Connector P6 DBC-25P

Wire #24 STRANDED 17

From	To	Function	
1	A	+5 VDC	
2	C	-12 VDC	
3	N	FWD	
4	M	REV	
5	E	REPEAT	
6	15	STROBE	✓
7	2	STROBE RETURN	
8	12	DATA 7	✓
9	14	DATA 6	✓
10	10	DATA 5	✓
11	5	DATA 4	✓
12	6	DATA 3	✓
13	B	GND	✓
14	B	GND	✓
15	H	CENTER LEFT	
16	J	CENTER RIGHT	
17	K	CENTER UP	
18	L	CENTER DOWN	
19	7	DATA 2	✓

Lead to be added

# Computer / Keyboard Interface Cable

From	To	Function
20	8	DATA 1
21		
22		
23	2	GND
24	2	GND
25	1	+5 VDC

# KEYBOARD

## BACKPLANE WIRING

From - NOVA BACKPLANE

To - CONNECTOR P6

Wire - #30 AWG

DBC-255

From	To	Function
S16-A3	1	+5 V DC
S17-B15	2	-12 V DC
S16-B40	3	FWD
S16-B36	4	REV
S16-B38	5	REPEAT
S16-B48	6	STORE
S16-B50	7	STROBE RETURN
S16-B49	8	DATA 7
S16-B52	9	DATA 6
S16-B51	10	DATA 5
S16-B54	11	DATA 4
S16-B53	12	DATA 3
S16-B2	13	GND
S16-B1	14	GND
	15	
	16	
	17	
	18	
S16-B67	19	DATA 2

126/22



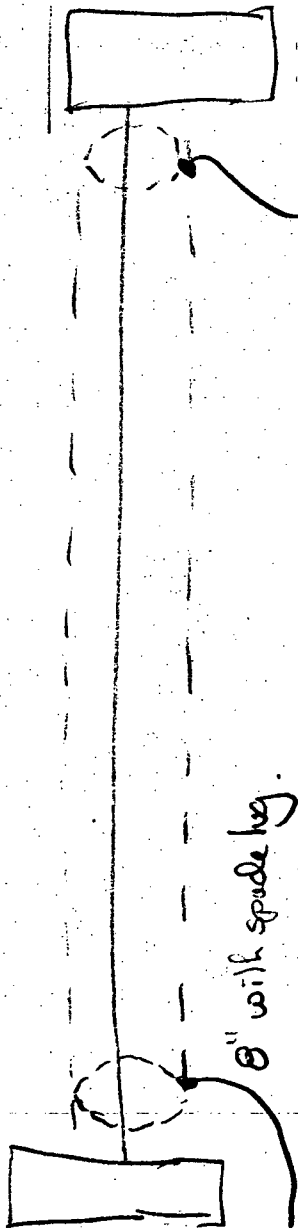
# Keyboard BACKPLANE WIRING

From	To	Function
S16-B69	20	DATA 1
	21	
	22	
S16-B2	23	GND
S16-B2	24	GND
S16-AH	25	+5VDC

COMPUTER

9 1/2 ft

PROJECTION  
ELECTRONICS



ADB52P

8" with spade lug.

ADB52S

COMPUTER / PROJECTION ELECTRONICS  
INTERFACE CABLE

# COMPUTER / PROJECTION ELECTRONICS INTERFACE CABLE

FROM COMPUTER J7 2DB52P  
 TO PROJECTION ELCC 2DB52S  
 WIRE #24 STRANDED.

FROM	TO	FUNCTION
1	1	DATA 0
2	2	DATA 1
3	3	DATA 2
4	4	DATA 3
5	32	LOAD OUT RETURN
6	6	LOAD OUT
7	7	FWD
8	32	START RETURN
9	9	START
10		N/C
11		N/C
12		N/C
13		N/C
14	14	LIGHT PEN RETURN
15	15	LIGHT PEN
16		N/C
17		N/C
18	18	DATA 4
19		N/C

# COMPUTER / PROJECTOR INTERFACE CABLE

From	To	Function
20	20	<u>DATA 5</u>
21	21	<u>DATA 6</u>
22	22	<u>DATA 7</u>
23		N/C
24	32	SEARCH RETURN
25	25	SEARCH -
26		N/C
27		N/C
28		N/C
29		N/C
30		N/C
31		N/C
32	32	GND
33		N/C
34		N/C
35		N/C
36	36	<u>DATA 8</u>
37	37	<u>DATA 9</u>
38	38	<u>DATA 10</u>
39	39	<u>DATA 11</u>
40	32	LOAD IN RETURN
41	41	LOAD IN
42	42	REV
43		N/C

# Computer / Projector Interface Cable

From	To	Function
44		N/C
45		N/C
46	46	CENTER UP
47	47	CENTER DOWN
48	48	CENTER FWD
49	49	CENTER REV
50	50	SPARE
51	51	SPARE
52		N/C (DO NOT USE)

# Holographic projector backplane wiring

From - Nova BACKPLANE

To - Connector P2

2DB5ZS

USE WIRE \*30 AWG

From	To	Function
S16-A91	1	DATA 0
S16-A92	2	DATA 1
S16-A89	3	DATA 2
S16-A90	4	DATA 3
S16-A99	5	LOAD OUT RETURN
S16-A73	6	LOAD OUT
S16-A76	7	FWD
S16-A99	8	START RETURN
S16-A71	9	START
	10	
	11	
	12	
	13	
S17-A99	14	Light Pen Return
S17-A67	15	LIGHT PEN
	16	
	17	
S16-A87	18	DATA 4
S16-A1	19	GND

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# Projector Backplane Wiring

From	To	Function
S16 - A88	20	<u>DATA 5</u>
S16 - A85	21	<u>DATA 6</u>
S16 - A86	22	<u>DATA 7</u>
	23	
S16 - A1	24	GND
S16 - A67	25	SEARCH
S16 - A100	26	SEARCH RETURN
	27	
	28	
	29	
	30	
	31	
S16 - A2	32	GND
	33	
	34	
	35	
S16 - A83	36	<u>DATA 8</u>
S16 - A84	37	<u>DATA 9</u>
S16 - A81	38	<u>DATA 10</u>
S16 - A79	39	<u>DATA 11</u>
S16 - A100	40	LOAD IN RETURN
S16 - A69	41	LOAD IN
S16 - A75	42	REV
S16 - A2	43	GND

# Projector Backplane wiring

From	To	Function
	44	w/c
	45	N/C
	46	N/C
	47	N/C
	48	N/C
	49	N/C
	50	N/C
	51	N/C
	52	N/C



# INTER CONNECTOR WIRING -

FROM	KEYBOARD	<u>P6</u>	DBC-25S
TO	PROJECTOR	<u>P7</u>	2DB52S
WIRE	#24		

FROM	TO	FUNCTION
15	49	CENTER LEFT (REV.)
16	48	CENTER RIGHT (FWD)
17	46	CENTER UP
18	47	CENTER DOWN

## BACKPLANE JUMPERS

From	To	FUNCTION
S3-B6	S17-B11	60 HZ
-15VDC	S17-B13	-15VDC
S17-B19	S16-B19	7.5 HZ
S15-A95	S15-A96	INTP
S14-A93	S17-A94	DCHP

Use #30 AWG